DOCUMENT RESUME

ED 404 344 TM 026 077

AUTHOR	Testa, Alec M.
TITLE	DATAWave. Volume 3, Numbers 1-7.
INSTITUTION	Eastern New Mexico Univ., Portales. Assessment Resource Office.
PUB DATE	24 Jan 96
NOTE	32p.
PUB TYPE	Collected Works - Serials (022) -- Reports - Evaluative/Feasibility (142)
JOURNAL CIT	DATAWave; v3 n1-7 Jan-Apr 1996
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*College Students; *Educational Assessment; Educational Planning; Educational Research; Financial Support; Focus Groups; Grants; Higher Education; Mathematics Achievement; Outcomes of Education; *Program Evaluation; *Student Evaluation; Test Construction; Testing Programs; *Test Results; Test Use
IDENTIFIERS	ACT Assessment; *Collegiate Assessment of Academic Proficiency; *Eastern New Mexico University

ABSTRACT

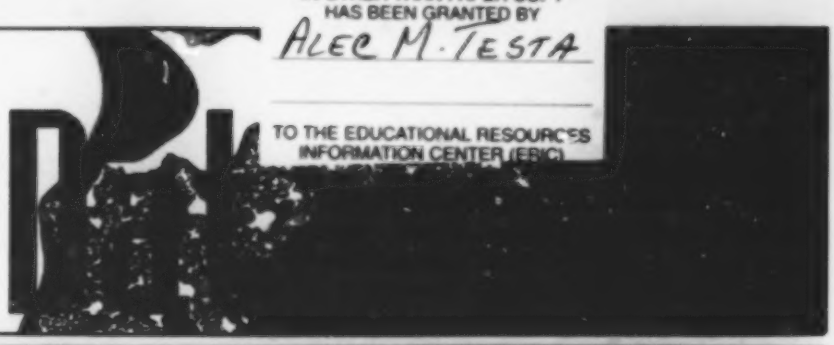
The DATAWave is a bi-weekly publication of the Assessment Resource Office (ARO) at Eastern New Mexico University (ENMU). Its purpose is to inform the campus community and broader constituencies on assessment issues and practices at ENMU. The seven issues of winter and spring 1996 cover the following topics: (1) a preview of ARO activities, Academic Outcomes Assessment Plans, the New Mexico higher education assessment conference, and available research fundings and opportunities; (2) summary information from 1986 through 1992 on the College Outcomes Measurement Program (COMP) at EMU, which assesses the general education program through student outcomes; (3) summary information for the Collegiate Assessment of Academic Proficiency (CAAP), which replaced the COMP in 1993; (4) student responses from focus groups and exit interviews used to evaluate university programs; (5) CAAP mathematic results; (6) information on student mathematics achievement from the American College Testing Program and other sources; and (7) CAAP Science Reasoning Test results. (Contains 14 figures.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY
ALEC M. TESTA
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 404 344



Volume 3, No.1 Published by Assessment Resource Office, Eastern New Mexico University Date: 1-24-96

Spring Preview

Over the holiday, in fact in preparing for the New Year, I set to paper the projects for the Spring 1996 semester for the Assessment Resource Office. For planning purposes this was probably a good idea. For the purposes of relaxing with family and enjoying my hometown in California, it probably was not a good idea. Regardless, what is done is done, and I'd like to use part of this DATAWave to discuss the many activities planned in outcomes assessment, all of which will hopefully help ENMU be a more responsive institution.

Though I will discuss these in greater detail, briefly the ARO activities will be to:

- Develop Outcomes Assessment Plans for non-instructional areas for implementation in the next academic year.
- With the office of Alumni Services, coordinate and implement an alumni survey.
- Conduct a survey of employers of ENMU graduates, determine what skills and abilities they seek in an employee, and to what extent Eastern meets their needs.
- Assist, with Planning and Analysis and the Office of Counseling and Testing, in the planning of CAAP assessment.
- Coordinate the Spring 1996 semester's efforts for Assessment Day (April 3, 1996).
- Continue statewide assessment activities.
- Systematically analyze and report CAAP and general education outcomes.
- Develop strategies to increase faculty and staff involvement in the analysis of outcomes assessment data.
- Possibly implement a follow-up survey to the CIRP Freshman Survey that Eastern has administered since 1987.

Outcomes Assessment Plans

In 1995, ENMU and all other institutions accredited by the North Central Association of Colleges and Schools (NCA) were required to submit a *Plan for Assessment of Student Academic Achievement*. This document was recently reviewed by the consultant/evaluator corps of the NCA and approved. In developing its *Plan*, each academic department was required to develop an Academic Outcomes Assessment Plan (AOAP) for implementation in academic year 1995-1996.

As part of the University's ongoing efforts to improve the services offered to its various constituencies, and to demonstrate to these constituencies that we are faithful stewards of the public's resources and trust, the Assessment Committee has determined that all nonacademic programs and services of ENMU should prepare, implement, and participate in a program of outcomes assessment. This is consistent with the charge to the Committee from President Frost:

- Develop an institutional assessment plan that is consistent with our mission and NCA expectations and recommend a strategy for its implementation in a timely fashion.
- Establish criteria, instruments and processes and an implementation strategy for assessment of nonacademic program areas.

It is known that many of the nonacademic areas are actively involved in various forms of measuring their effectiveness. Typically these efforts are surveys, anecdotal information, and employee evaluation. Some areas use more strategic methods, such as Management by Objectives. Such activities do not facilitate a systematic review and reporting of program effectiveness. Of course, effective measuring of program success, and eventual improvement, will lead to a higher functioning University. It is anticipated that most units can articulate what is required to do their job well, and can demonstrate, when asked, that they do so.

(continued on page 2)

TM026077

BEST COPY AVAILABLE

OAP's consist of:

- a goal statement related to the University's Mission Statement
- 3-5 intended outcomes or objectives related to the goal statement
- for each intended outcome or objective, two or more assessment criteria and procedures using multiple measures (that is, you should not rely on one data source)
- an implementation plan that details the person (by job title, not name) responsible, who they are responsible to, how the assessment will be conducted, what measures will be used, and how the results will be disseminated
- Following implementation, the outcomes assessment plan will include the results of assessment criteria and how the results will be used

Beginning in AY 1997-1998, each non-instructional unit will submit a report by November first of each year to the appropriate senior administrator. These reports will include:

- results of the previous year's OAP,
- discussion of strengths and weaknesses of the program as measured by the previous year's OAP,
- recommendations for changes or modifications in the unit's academic program or pedagogy, and
- an OAP for the current year with a rationale for any changes from the previous year.

The Assessment Committee is in the process of developing timelines for the development of OAP's and protocol for their review. This brief article is intended to inform the campus community and solicit suggestions for improvement.

Outcomes assessment, for both instructional and non-instructional areas, has its purpose of demonstrating institutional effectiveness and discovering ways to improve the services offered to the University's various constituencies. Ultimately, students will be rewarded with an improved educational process, employees will be rewarded with a more pleasant workplace, and taxpayers will be rewarded with more efficient use of the resources made available to the institution. The Assessment Committee recognizes that many units of the campus currently provide excellent services and monitor their obtainment of goals.

SURVEYS

Alumni: In determining how we can improve learning here at Eastern, our graduates are an untapped source of information. Having had the opportunity to take their learning and apply it in the real world, I suspect ENMU graduates may have suggestions to improve our curriculum. The Alumni Office, specifically Stephanie Spencer and Winston Cox, agree. The survey of alumni will focus on what aspects of their learning graduates find most helpful in the "real world," and what additional skills and experiences they would have liked to have had. Furthermore, the survey will ask questions relevant to the alumni association membership and services.

Employers: As a liberal arts institution which prepares students for careers, as well as graduate programs, an important source of information on Eastern's curriculum, teaching, and students are the employers of our graduates. In addition to learning what skills and abilities employers want, the Assessment Resource Office will be learning the extent to which the University is meeting employer's needs. It is anticipated that this survey will be conducted by telephone. Members of the campus community are asked to contact the Assessment Resource Office with the names of possible contacts.

Faculty: Beginning in November of 1995, members of the faculty received a survey sponsored by the Higher Education Research Institute at U.C.L.A. Members of the faculty who did not complete the survey will receive follow-up/reminder letters during the spring. Reports from the survey will be announced in the fall.

Students: Eastern has participated in the CIRP Freshman Survey for years. I would like for Eastern to participate in the CIRP College Student Survey (CSS). The CSS asks many of the same questions as the Freshman Survey and is designed as a follow-up measure. By using the CSS, analysis of changes in students' attitudes, behaviors, goals, and values will be possible. There are benefits to conducting the survey as either a cross-sectional study or longitudinal study. Given the nature of the shifting student body at ENMU, this analysis most likely will be cross-sectional in nature. Considerations regarding sample size and procedures are still being made.

(continued on page 4)

Assessment Conference

The 1996 State of New Mexico Higher Education conference will be held on February 22 and 23 in Albuquerque at the La Posada de Albuquerque hotel. The conference theme is the Route to Excellence. Dr. Testa of the Assessment Resource Office is the chair of this year's conference steering committee.

The conference is designed for faculty, staff, and administrators involved in outcomes assessment at New Mexico higher education institutions. A special emphasis of the conference will be on outcomes assessment activities that work and have led to documentation of student learning, and to change.

This conference has been designed and developed by local practitioners in order to share the successes and failures experienced at New Mexico's higher education institutions. Conference participants will have the opportunity to learn how similar institutions and programs have addressed outcomes assessment, share their own experience, and discover instruments and tools available from national publishers. The conference program has workshops for the person just learning about outcomes assessment as well as the experienced practitioner.

Several members of the Eastern faculty and administration will be presenting at the conference. They are Dr. Andrea Broomfield, *Making It Matter: Assessment From the Junior Faculty Member's Perspective*; Dr. William Calton, *Development of the Assessment Plan at Eastern New Mexico University*; Dr. David Eisler and Dr. Calvin DeWitt, *Assessing the Benefits of Technology in the Teaching/Learning Process*; Dr. Greg Erf, *The Art of Assessment*; Ms. Janeice Scarbrough and Ms. Angie Eskins, *Addition/Portfolio Review in the Fine Arts*; Dr. Anthony Schroeder, *ITV Services Assessment*; Dr. Nile Stanley, *Outcomes-Based Assessment from a Vygotskian Perspective*; and Dr. Alec Testa, *Assessment 101*.

The Assessment Resource Office will be able to assist a number of faculty and administration from Eastern to attend the conference. Support will include conference registration, per diem, and mileage for those who share a ride. Conference brochures and information regarding support is available to those individuals interested in attending. Contact Dr. Alec Testa of the Assessment Resource Office at extension 4313.

Research Funding/Opportunities Available?

One of the main responsibilities of the Assessment Resource Office is to increase faculty participation in the analysis of assessment data. In the DATAWave during last year, analyses of assessment data from the Cooperative Institutional Research Project (CIRP) Freshman Survey, the College Outcomes Measures Program (COMP), the Collegiate Assessment of Academic Proficiency (CAAP), the Student Satisfaction Inventory (SSI), retention data and other sources were reported. Frankly, to date, the reports have just begun to scratch the surface.

Seemingly, the wealth of data that's available could provide interesting research opportunities to new faculty or faculty looking for new research endeavors. Interested parties are encouraged to talk to Dr. Testa regarding research activities. More importantly, the Assessment Resource Office can provide support to interested individuals. Such support could be release time, special pay, or travel to conferences. Should funding be provided to a faculty member to analyze assessment data, one condition would be the requirement that the results be disseminated either through the DATAWave, publication, or presentation.

During the course of the semester specific guidelines or procedures for funding of faculty efforts may be developed. However, in the meantime, interested parties should contact Dr. Testa at extension 4313.

Analysis and Reporting of General Education Outcomes

In past editions of the DATAWave, Collegiate Assessment of Academic Proficiency (CAAP) results have been reported. Beginning with this third volume of the DATAWave, CAAP results will be reported in a systematic and formalized fashion. Over the next six editions of the DATAWave results from the COMP from 1987 to 1992 will be discussed as well as the scale scores for the CAAP (writing, reading, mathematics, science reasoning, and critical thinking). It is planned that these results will be updated every spring and be reported through the DATAWave in order that the campus community might remain informed of outcomes assessment results.

(continued on page 4)

(general education outcomes continued)

The analysis that I plan to conduct would include comparison of mean scores for a variety of subgroups. These groups would include transfer students versus students who began at Eastern as native freshmen, CAAP performance by grade earned in general education courses (i.e., English 102 for writing scores, Biology 113 for science reasoning scores), students who pass versus students who do not pass, Eastern's performance versus national norms, trends in CAAP scores by test administration date, and trends in CAAP scores by term in which courses were completed. Some regression analysis might also be conducted in which grades earned or terms completed or other variables are used to account for the total variance in CAAP scores.

It's my intention when reporting these results throughout the semester to offer only the briefest explanation of the data, so as to invite the campus community to analyze the results.

(surveys continued)

For All Surveys: Members of the campus community are invited to provide questions or data elements they would like collected. The Assessment Resource Office has a Variables Menu available to help you prepare a query.

DATAWave
published biweekly by the Assessment Resource Office
Eastern New Mexico University
Editor: Alec M. Testa, Ed.D.
Production: Irene Nolen
De Guinn
Please send comments to: Assessment Resource Office
Station 9
Eastern New Mexico University
Portales, NM 88130
Office: (505)-562-4313
EMail: testaa@ziavms.enmu.edu

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130

Volume 3, No. 2 · Published by Assessment Resource Office, Eastern New Mexico University · Date: 2-7-96

The College Outcome Measures Program at ENMU

Eastern New Mexico University (ENMU) began outcomes assessment of its general education curriculum in the fall of 1986 through the administration of the College Outcome Measures Program (COMP) published by the American College Testing Service. The COMP yields a Total Score and Subscale Scores in: Functioning Within Social Institutions, Using Science, Using the Arts, Communicating, Solving Problems, and Clarifying Values. Descriptions of these scale scores and other psychometric properties can be found on the last page.

The purpose of this report is to provide some summary information on the more than 7,000 results obtained from 1986 to 1992. To interested parties, a more comprehensive review of the materials is available. For the years 1986 and 1987, freshmen only participated in the COMP administration. Beginning in 1988, juniors (students with more than 60 credit hours) were added to the cohort. The intention was to compare the scale scores of freshmen and juniors. Any change would then be attributed to student learning here at Eastern New Mexico University.

Many hours were spent exploring the various analytical scenarios for interpreting the data. Sometimes it's best to tell people what happened, non-statistically, and allow conclusions to be made. For example, in analyzing scores, cohorts could be compared by year, class level, or longitudinally. However, without controlling for the effects of courses completed, transfer courses, incoming ACT, age, gender, etc., it would be difficult to form conclusions.

1986

In 1986, 696 freshmen participated in the COMP administration. The hypothetical "average freshman" in the sample scored at the 43rd percentile on the Total Score. Subscale means ranged from the 35th to 55th percentile. (ENMU's incoming non-enhanced ACT composite mean scores were 17.4 versus 20.5 for the reference group). Relative strengths were evidenced in Using the Arts and Solving Problems, while scores in Communicating were described as relatively weak. ACT alludes that the lower COMP composite scores might be influenced by lower ACT scores—that is, lower achievement as measured by the ACT score was associated with lower achievement as measured by the COMP (ACT, 1986).

1987

In 1987, 568 freshmen participated in the COMP program. A hypothetical "average freshman" in the sample scored at the 32nd percentile on the Total Score compared to freshman norms. Subscale scores ranged from the 20th to the 37th percentile. Again, the non-enhanced ACT composite mean scores were lower than the national reference group (16.6 versus 20.1). Relative strengths for the year were found in Using the Arts and relative weaknesses were indicated in Functioning Within Social Institutions. Again, there appears to be an association with the lower mean ACT scores achieved by Eastern students and the lower COMP scores; however, it is observed that the general strengths and weaknesses from 1986 to 1987 do not overlap. Also it is observed that, in general, COMP scores from the 1987 sample were lower than the 1986 sample (ACT, 1987).

1988

Six hundred seventy-six freshmen participated in the COMP. For the 1988 cohort, the Total Scores and all Subscale Scores were higher than the previous year; though in 1986, only the Using Science and Clarifying Values subscales were higher. For the 1988 freshman group, the cohort scored nearly 6 points below the reference group. ACT attributed this difference to the students relative weakness in two subscale areas, Functioning Within Social Institutions and Communicating. Again, there were significant differences in the incoming students ACT scores. Eastern students had a non-enhanced ACT composite of 17.8 while the 4-year reference group had a 20.2 average. For the first three years for the freshman cohort, there is no observable trend in the data with the exception that all Subscale Scores, the Total Score, and the ACT score remain below national averages.

More importantly, 1988 was the first year that rising juniors (students with between 60 and 89 credit hours completed) participated in the COMP. The intention was to provide an examination of "gain scores."

TM026077

BEST COPY AVAILABLE

In 1988, the Office of Planning and Analysis found that the score of juniors and the total junior population was generally comparable to the reference groups. There is no specific identifiable parameter that counts for the difference in the scores (ENMU 177.3 versus national 181.1). One hundred forty-two scores were available for junior students who had participated in the COMP as freshmen. On the total scale, the changing range of scores was from -35 to +45 points. According to ACT, given pre- and post-test scores and mean ACT scores, Eastern's reference groups' estimated gain was 7.6 points.

There were significant differences between Eastern and the reference group in the area of Functioning Within Social Institutions (Eastern scored lower), yet, on the other hand, the largest increases were noted in Using Science and Clarifying Values.

In all areas, juniors scored higher than freshmen. Further, it can be observed that juniors who were natives at Eastern scored higher than non-native students (OPAS, 1989).

1989

One thousand one hundred seventy-three students participated in the COMP in 1989, and of these students, 645 were entering freshmen and 498 were juniors. One hundred three of the rising juniors participated in the COMP as freshmen. The hypothetical "average freshman" in the sample scored at the 59th percentile on the Total Score. This year's reference group was from 2-year institutions. The reason for the change in normative groups is unexplained. Also, means for the Subscale Scores ranged from the 53rd to 64th percentile. It is observed that the change to 2-year reference groups allowed for a more favorable comparison of ACT enhanced scores (17.7 for Eastern versus 17.0 for the national reference groups). Compared to the reference group, the 1989 sample of freshmen evidenced some relative strengths in Functioning Within Social Institutions and Communicating (compared to 1986 and 1987), but indicated relative weaknesses in Using the Arts, Solving Problems, and Clarifying Values (ACT, 1989).

Junior scores were compared to sophomore scores at 4-year institutions. Eastern students scored at the 39th percentile in comparison to this group, while Subscale Scores ranged from the 30th to 49th percentile. Among rising juniors, comparative strengths were seen in Functioning Within Social Institutions and Communicating, and scores for Clarifying Values were relatively weak. It should be noted that for both groups, ACT reports that Eastern students compared favorably or more than favorably for Total Scores and Subscale Scores. Among those students in the longitudinal analysis (those with freshman and junior scores), gain scores ranged from - 25 to 30 points. Of those students with valid scores, a total mean gain of 5.9 was measured in comparison to 7.6 for the national sample. Students at Eastern in the longitudinal sample did evidence a gain in their scores, however, not as much as schools in the national group.

1990

One thousand one hundred fifty-one students participated in the ACT COMP in 1990 (651 freshmen, 510 juniors). The Total Score for freshmen was 167.1 and 177.6 for juniors. Eastern's scores were favorable when compared to 2-year institutions, yet more than 5 points lower when compared to 4-year institutions in the normative samples. The score for the juniors was also lower by more than 5 points when compared to the national reference group. The gain score among students who participated in the COMP as both freshmen and juniors in 1990 was at 7.7; this represented a significant increase over 1989. The text of the report from ACT for the 1990 cohort was not available. However, the most salient points which can be observed are that the gain scores evidenced by the junior cohort were greater than in previous years. Mean scores for freshmen and juniors on Total and Subscale Scores remain relatively consistent. Through the first five years of the COMP administration at Eastern New Mexico University, the data clearly indicates that Eastern students are scoring lower than reference groups at 4-year schools and that the size of the gain scores appears to be growing (OPAS, 1991).

1991

In 1991, 1230 students participated in the COMP; 704 of these were freshmen and 512 were rising juniors. In 1991, freshman students were again compared to students at 4-year institutions and the hypothetical "average freshman" in the sample, excluding questionable scores, was at the 48th percentile and the Total Score and Subscale Scores ranged from the 39th to the 65th percentile. Eastern students compared favorably to the national sample in ACT enhanced scores with a mean of 20.1 versus 19.6 for the national reference group. When compared to like institutions, Eastern compared most favorably in Functioning Within Social Institutions, Using Science, and Communicating, but less favorably in Using the Arts, Solving Problems, and Clarifying Values.

Juniors in the sample did not compare as favorably as freshmen. The hypothetical "average rising junior" within the sample scored at the 35th percentile on the Total Score with Subscale Scores ranging from the 35th percentile to the 45th percentile. ACT compared the results of Eastern students to students at seven other similar institutions, both in 1989 and 1991; and reported "in view of the results, both your current sample and your 1988-89 aggregate sample

of rising juniors compared poorly with this reference group of second semester sophomore samples" (pp. 12, ACT, 1992). With regard to gain scores, Total Scores ranged from -56 to +62 points. The reported gain scores, when comparing freshman means to junior means, was again slightly above seven, which was below the national average.

1992

In 1992, 1245 students completed the COMP, and of these, 665 were freshmen and 552 were juniors (in all cases, sums less than the total were due to students other than freshmen or juniors participating in the COMP). For frustrating and unanswerable reasons, the results from 1992 were again compared to 2-year institutions. When compared to this normative group, Eastern students scored at the 70th percentile with Subscale Scores ranging from the 64th to the 70th percentile. ACT reports that Eastern freshmen show strengths in all COMP areas. When compared to the 2-year cohort, the ACT scores of incoming students were comparable.

The junior cohort in 1992 was compared to seniors at 4-year institutions. When compared to seniors, our juniors scored at the 36th percentile on the Total Scores with Subscale Scores ranging from the 39th to 61st percentile. When compared to sophomores, our juniors compared in a ranking from like institutions, and Eastern students scored at the top. With regard to gain scores, the Total Scores range from -49 to +66. The estimated mean gain of 13.1 raw score points calculated by ACT was an amount of growth substantially above the average for the previous years.

In comparing the five years for which gain scores were available, ACT made the following observations:

- The overall gain for the 1992 sample was higher than the gains for any of the previous longitudinal samples;
- Compared to all previous longitudinal samples the 1992 sample evidences a substantial amount of growth in Using Sciences, Using the Arts, and Solving Problems, and also a substantial gain in Clarifying Values;
- Weaknesses were indicated for 1992 in Communicating and Functioning Within Social Institutions;
- For the five samples, the least amount of variation was found in Communicating and, except for the 1992 sample, there was small variation in Using Science, Communicating, and Solving Problems;
- Except for the 1992 and 1988 samples, means clustered near the median in Using Science, Using the Arts, Communicating, and Clarifying Values, and just above the median in Solving Problems; and
- Positive results were seen in the ENMU sample and other COMP areas except Communicating and Functioning Within Social Institutions. ACT considered these impressive and that they may have been indicative of changes in program and instruction.

The last year that the COMP was used by ENMU for the analysis of its general education curriculum was in 1992. Ironically, it was also in 1992 that substantial changes and improvements began to be recognized in the COMP. However, conclusively throughout, Eastern students seemed to score lower. This most likely is attributed to admission policy and student preparation. Reasons for eliminating the COMP exam included difficulty in interpretation of Subscales and Total Scores as being relevant to the general education curriculum, and difficulty in analysis of various cohorts.

Conclusion

Only small attempts were made by the OPAS in analyzing the reams of information that was made available by ACT. It most likely could be observed that in the beginning of Eastern's assessment efforts, the intentions were either to show gain scores and/or to demonstrate comparison to national normative groups. As the outcomes assessment endeavors here at Eastern have matured, it has become more important to demonstrate how students have learned and how that can be tied back to the curriculum. The COMP in particular provided difficulties in tying student results back to student learning. In addition, personnel and resources were lacking to successfully compare students' transcripts and incoming variables to the eventual results.

So, finally, it can be observed that gain scores were measured by the COMP. We further can observe that Eastern students apparently had consistent trouble with the scales of Functioning Within Social Institutions and Communicating. In comparison, Eastern students scored relatively higher in the remaining areas. It appears that the replacement of the COMP with the Collegiate Assessment of Academic Proficiency (CAAP), also produced by ACT, was probably a prudent decision by the Assessment Committee in 1992. However, it appears that a good decision was also made by the General Education Committee to include in their outcomes assessment plan qualitative measures obtained through focus group, surveys, and exit interviews. It is the opinion of this author that perhaps the best measures of learning will occur when we can consistently articulate to students what it is that they should learn, and ask them to demonstrate that the learning has occurred.

Lastly, in considering the economic and personal resources outlayed for the administration of the COMP for a 7-year period, it should be observed that the institution did

learn and mature through the process, and that, if required, the institution could have demonstrated to external constituencies its attempts to measure student learning and to improve the academic programs.

NOTE: Interpretation of all COMP results are spurious due to the number of results which were excluded from analysis ranging up to 40 percent for some cohorts. Results were eliminated because of apparent randomness in results and/or low scores or high scores which indicated that some efforts were sabotaged by students. Complete and full analysis of all COMP results have been conducted by ACT as well as the Office of Planning and Analysis Services. These are all on file in the Assessment Resource Office for individuals interested in more detail.

Descriptions of COMP Scale Scores

Communicating

Ability to send and receive information:

- *In a variety of modes: written, graphic, oral, numeric, symbolic*
- *In a variety of settings: one-to-one, small group, large group*
- *For a variety of purposes: to inform, to understand, to persuade, to analyze*

Solving Problems

- *Ability to analyze a variety of problems: scientific, social, personal*
- *Ability to select or create solutions to problems*
- *Ability to implement solutions*

Clarifying Values

- *Ability to identify one's personal values and the personal values of other individuals*
- *Ability to understand how personal values develop*
- *Ability to analyze the implications of decisions made on the basis of personally held values*

Functioning Within Social Institutions

- *Ability to identify activities and institutions that constitute the social aspects of a culture*
- *Ability to understand the impact that social institutions have on individuals in a culture*
- *Ability to analyze one's own and others' personal functioning within social institutions*

Using Science and Technology

- *Ability to identify activities and products that constitute the scientific and technological aspects of a culture*
- *Ability to understand the impact of scientific and technological activities and products on individuals and the physical environment in a culture*
- *Ability to analyze the uses of technological products in a culture, including one's personal use of such products*

Using the Arts

- *Ability to identify activities and products that constitute the artistic aspects of a culture*
- *Ability to understand the impact that art, in its various forms, has on individuals in a culture*
- *Ability to analyze the uses of works of art within a culture and one's personal use of art*

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130

BEST COPY AVAILABLE

Volume 3 No 3 Published by Assessment Resource Office Eastern New Mexico University Date 2-21-96

CAAP Writing Results

Eastern New Mexico University has assessed students' learning in general education through objective testing since 1986. Results from the College Outcome Measures Program (COMP) was reported in the last edition of the DATAWave. The COMP was used from 1986 to 1992, and in 1993 was replaced by the Collegiate Assessment of Academic Proficiency (CAAP). The CAAP yields scale scores for writing, reading, mathematics, science reasoning, and critical thinking. Each of these scale scores will be examined in some depth through the DATAWave this semester—beginning with writing. To perhaps better understand students' performance on the CAAP and learning which occurs here at Eastern, students' CAAP performance on the writing scale will be compared to letter grades in general education courses, incoming ACT scores in English, the semester in which they participated in the CAAP, the term in which they completed their general education coursework, their self-reports of academic and writing abilities, their motivation in completing the CAAP, freshman students versus transfer students, and by gender.

The writing scales test of the CAAP consists of 72 items in a multiple choice format designed to be completed within 40 minutes. The test measures students' understanding of standard written English in usage/mechanics (punctuation, grammar, sentence structure) and rhetorical skills (strategy, organization, style).

Analysis

Students at Eastern complete the CAAP at the rising junior status (between 55 and 65 credit hours completed), and are compared to a national normative sample of college sophomores. The CAAP is designed to be given to students at the end of their sophomore year to measure their learning in general education.

Usage/mechanics and rhetorical skills form subscales of the writing scales score. Spelling, vocabulary, and rote recall of rules of grammar are not tested. The fall 1995 normative sample for 4-year public college sophomores was 64.1 for writing scales, 17.1 for usage/mechanics, and 17.0 for rhetorical skills. Fall 1995 norms are being used for purposes of simplicity. (Norms for each year of CAAP administration are available in the Assessment Resource Office.) For all three scales, Eastern students scored slightly below the national norms (writing scores-63.05, usage/mechanics-16.61, and rhetorical skills-16.57). In examining histograms of the distribution of scores, the scores for each of the scales appear to be normally distributed though somewhat leptokurtic (This indicates that the scores tend to mass towards the means). In comparing the standard deviation of scores for the normative sample to Eastern's results, they appear to be similar. All normative information as well as a list of schools that make up the 4-year college sophomore cohort is available in the Assessment Resource Office.

The philosophy of general education of Eastern New Mexico University is stated on page 53 of the 1995-1997 Undergraduate Catalog. Most pertinent to this report is that the graduate of ENMU shall "use written and spoken English effectively, which includes the ability to read and to listen with understanding and critical discernment." Courses in the general education requirements that must closely address this goal would be English 102 and 104. CAAP scale scores of reading and critical thinking may also be measures of appropriate learning in these classes to achieve the aforementioned goal. It is understood that objective testing alone would not measure this goal for the purposes of assessing learning. CAAP testing is augmented by the use of exit interviews, focus groups, and surveys. These results are summarized and provided to the general education committee on a regular basis. CAAP results are shared here as a means of informing the entire campus community.

English 102, English Composition, is a course which includes "sentence and paragraph grammar; literacy models; writing narrative, persuasive, and expository papers; enhanced critical thinking and writing skills." English 104, English Compostion and Research, is "a continuation of English 102; applies critical thinking, reading, and writing skills to research paper writing." To this researcher, it seems these classes are the best cases of the type of learning which should occur in a general education pattern to be measured by CAAP results. In analyzing the results for English 102 and 104, letter grades were recoded in numeric values with letter grades of A = 4, B = 3, C = 2, D = 1, F = 0, S = 2, and W = missing variables. [When reporting results, space would not permit the inclusion of a sum of squares means, standard deviations, degrees of freedom, and the number of cases for all analyses conducted. This report will focus on informing the reader the trends in the data, and when the results were statistically significant.]

Of the 892 CAAP results available, letter grades in English 102 were found for 447 students. For this group 168 earned a grade of A, 166 the grade of B, 99 the grade of C,

BEST COPY AVAILABLE

7 the grade of D, and 7 the grade of F. For the overall writing score the highest mean score was found for students with the letter grade of C; however, the mean scores were not statistically significant in their difference. Overall the mean score for students in the cohort was 63.00. Similarly on the subscales, higher scores were not associated with higher grades, and the distribution of means were not statistically significant. This indicates that the scores earned on the CAAP when examined by grades earned in English 102 do not represent different groups of students.

Five hundred sixty-three students who have participated in the CAAP have completed English 104 at Eastern. Two hundred six of these students have earned the letter grade of A, 185 the grade of B, 146 the grade of C, 20 the grade of D, and 6 the grade of F. The mean score of students who earned an A in English 104 was 64.65. This exceeds the national norm and ENMU average. Unlike the case with English 102, there appears to be a positive association between student performance on the CAAP writing scale and English 104. When the means are compared for the writing scale, there is a statistical significant difference. Similar results were found for the two subscales. It appears that the learning which occurs in English 104 is much more closely associated with that which is measured on the CAAP writing scale. Similarly, students who do well in English 104 perform better on the CAAP.

When regressing writing scale scores by letter grades earned in English 102, an insignificant amount of the variances is accounted for (R^2=.00056). When a similar analysis is conducted using English 104, a statistically significant amount of the total variance is accounted for-8%.

Working with ACT, it was possible to examine students English subscale scores on the ACT test with the writing scale score on the CAAP. This analysis was conducted by distributing students scores by deciles. In preparing the ACT/CAAP decile cohort matrices, ACT first matches all students who have taken both the ACT and CAAP assessment. They next construct decile categories for both the ACT and the CAAP assessment. Decile categories are based on all students in the reference group and not just on Eastern local results. (Please see Figure 1.) By interpreting the decile matrix, it is possible to see how students performed on the CAAP relative to their incoming ACT score. For example, in review of row 1, 39 students originally scored at the first decile on the ACT score. Subsequently, 24 of them improved beyond the first decile. Similarly, looking at the bottom row, 23 students originally scored at the highest decile on the ACT, and subsequently 18 of them no longer score at the highest level. Students who score below the shaded diagonal in the matrix are students for whom there is an overall decline in achievement when ACT scores are compared to CAAP scores, students in the shaded diagonal have remained above the same, and students above the diagonal have performed better. Overall, 41% of students' (131) relative performance declined as measured by the ACT and CAAP, 23% (73) remained about the same, and 37% (118) improved. Interpretation of these results is cautioned as they do not necessarily represent the entire learning which occurred in the general education courses here at Eastern New Mexico University; they are representative only of the students for whom CAAP and ACT scores could be matched. Also for those students who scored below the diagonal, this may or may not be representative of abilities, motivation, or intentions to sabotage test results.

In a linear regression analysis, 61% of the total variance in CAAP writing scores is accounted for in students' ACT scores. (Needless to say this was a statistically significant result.)

On the subject of writing motivation, students are asked to respond if they tried their best, gave moderate effort, gave little effort, or gave no effort in completion of the writing section of the CAAP. Needless to say, students performed better who tried their best. Of the 892 students who have completed the CAAP, 29 did not respond to this question, 579 indicated they tried their best, 251 indicated they gave moderate effort, 27 indicated they gave little effort, and 6 reported giving no effort. Students who tried their best scored on average 63.67 compared to 61.66 for those who gave no effort. This result was statistically significant. In a linear regression analysis writing motivation accounted for 3% of the total variance (R^2=.03), and this was found to be a statistically significant result.

In the September 20, 1995 (Vol.2, No.2) edition of the DATAWave, CAAP results were reported by term. When the writing scale scores are analyzed by CAAP administration date, it is observed that fall scores have been higher than the spring scores. Results from spring 1995 are the lowest to date. It is difficult to speculate that these are a function of testing conditions or students' abilities. However, the difference in mean scores for the various test dates is statistically significant at the .05 level. Because this is not a continuous variable, a linear regression could only be conducted if the values were dummy coded. This analysis was not conducted.

Next, students CAAP results were reviewed by term in which they completed English 102 and 104 (Note: In all cases when CAAP results were compared to course grades, courses were completed prior to the administration of the CAAP.) Students' completion dates for English 102 and 104 range from the 1970's to the present. The term in which students completed these courses were classified into 5 groups: 1973-1989, 1990, 1991, 1992, and 1993-1994. For English 102, 82 students were in the first cohort, 87 in the 1990 cohort, 149 in the 1991 cohort, 106 in the 1992 cohort, and 37 in the 1993-1994 cohort. For English 104, 48 students were in the first cohort, 55 in the year 1990, 156 in 1991, 184 in 1992, and 157 in 1993-1994. The mean scores were not statistically significantly different. The results of the 1993-1994 group may be associated with motivation and the relatively low performance of the spring 1994 cohort.

CAAP writing scale scores were also assessed by students' self-reported academic and writing abilities. This data was collected by the Cooperative Institutional Research Project (CIRP) Freshman Survey. Students can respond to questions about their academic and writing ability by an-

(continued on page 4)

Eastern New Mexico University ACT-CAAP Scores
Longitudinal Achievement Results

Student Group = **All Students** — **Writing** Test — Reference Group = **4-Year Colleges**

ACT Deciles	CAAP Deciles 1	2	3	4	5	6	7	8	9	10	Total	
1	15*	20	2	1	0	1	0	0	0	0	39	
2	10	17	3	3	2	0	1	0	0	0	36	2nd Quadrant
3	2	13	1	12	2	9	2	1	0	0	42	
4	0	3	1	4	1	3	1	0	1	0	14	
5	1	1	1	5	4	4	2	3	0	0	21	
6	0	4	3	11	8	7	4	5	6	1	49	
7	0	0	0	1	1	4	5	5	4	0	20	
8	0	3	0	5	1	9	13	5	11	3	50	4th Quadrant
9	0	0	0	0	1	2	3	9	8	5	28	
10	0	0	0	0	1	0	3	2	10	7	23	
Total	28	61	11	42	21	39	34	30	40	16	322	
1st Quadrant Totals	28	54	8	25	9	17	6	4	1	0	2nd Quadrant Totals	
3rd Quadrant Totals	0	7	3	17	12	22	28	26	39	16	4th Quadrant Totals	

Total Students = 322 — Students Above Diagonal = 118 (37%)

Students On Diagonal = 73 (23%) — Students Below Diagonal = 131 (41%)

* **Cell entries are actual n-counts for Eastern New Mexico University.**

Figure 1

swering if they thought they were in the top 10%, above average, average, or below average. Of the 892 CAAP participants, data from the CIRP Freshman Survey was available for 204. Fifty-six percent of students that rated their academic ability as above average or in the top 10% had writing scale scores of 65.2 and 66.4, respectively; well above the local and national norms. Forty percent of transfer students in the sample rated their writing ability as above average or in the top 10%, and their scores on the CAAP writing scores were also well above average-65.65 and 66.46 respectively. The differences in mean scores were statistically significant. Students' self-report of academic ability accounts for 20% of the total variance in scores in a regression analysis, and writing ability accounted for 18% when entered alone. Both of these results were statistically significant.

When CAAP writing scale scores were analyzed by gender, women students consistently scored better than did men. This was discussed in more detail in the February 6, 1995 (Vol.1, No.4) edition of the DATAWave. Women scored on average 63.92 compared to 61.73 for men, and again this was statistically significant at the .05 level. In linear regression, with gender entered as a dummy variable, 5% of the total variance was accounted for, and this too was statistically significant.

Students who self-reported they began at Eastern New Mexico University as a first-time freshman (n=524) scored higher than those who self-reported they transferred to the University (n=367). This score was also statistically significant. When this variable was converted to a dummy variable and entered into a linear regression, 1% of the total variance was accounted for, which was found to be statistically significant at the .05 level.

Conclusion

CAAP writing scale results were analyzed by: letter grades earned in English 102 and 104, ACT English scale scores, CAAP administration dates which determined completed courses, self-reported academic and writing abilities, student motivation, gender, and freshman enrollment status. Mean scores, when classified by these variables, differed significantly. However, most interesting is the difference associated with letter grades and ACT scores.

To better interpret how these variables may account for the total variance, all variables were entered into a linear regression step-wide method with the writing scale as the dependent variable. ACT English scores and English 104 scores were first to enter when all other independent variables were blocked, no other variables entered the equation. ACT English alone accounted for 62% of the total variance (R^2), and when English 104 entered the equation, the R^2 was raised to 64%. Again, no other variables could enter the regression analysis. This demonstrates that English 104 grades are associated with CAAP scores and inseemingly English 104 has a positive impact on CAAP writing scale scores.

In these brief pages of the DATAWave, an attempt has been made to look at the many variables which might impact CAAP writing scores. The purpose is to document student learning, and ways in which students education might be enhanced here at Eastern. Parametric statistics suggest that the learning which occurs in English 104 is adding to students knowledge base; more so than the background variables. One possible recommendation would be to do more of what is being done in English 104.

Members of the campus community are invited to make inquiries of this and additional data sets. You may also wish to request data sets for continued analysis. To inquire about such data sets and/or support for assessment research, please contact the Assessment Resource Office.

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130

Volume 3, No 4 Published by Assessment Resource Office, Eastern New Mexico University Date 3-6-96

Graduating Students Focus Group: Responses on Writing Scales

In addition to using CAAP results to assess our general education Academic Outcomes Assessment Plan (AOAP), exit interviews, focus groups, student surveys, and employer surveys are also used. In the last DATAWave, students' CAAP writing scores were analyzed. In this article, student responses from focus groups and exit interviews will be discussed. Students responses to exit interviews conducted by their college's dean were reported last semester. It is anticipated, perhaps in the fall, that employer survey results will be reported.

Focus groups were held for the first time in the fall of 1994 for students graduating that semester. Of the number of students who signed up for graduation, and after the elimination of out-of-state addresses, approximately 100 students were solicited to participate in focus groups. Care was taken to ensure that an appropriate sample by college, gender, and ethnicity was obtained. In addition to sending a personalized letter, follow-up telephone calls were conducted to schedule the day and time students might participate in one of the four focus groups. While 21 students registered to participate in the focus groups, 10 students actually participated.

The AOAP for general education indicates "the majority of upper division students will articulate how they have learned to write and speak English effectively, including the ability to read and listen with understanding and critical discernment." In an attempt to assess this, the following question prompts were used:

1. To what extent did the English courses assist you in your ability to write and speak English more effectively?
2. What are some specific examples of improvements in your ability to write and speak English more effectively?
3. To what extent do you believe your ability to read and listen with understanding was improved?
4. To what extent do you believe your ability to read and listen with critical discernment was enhanced?

As this was an initial effort at focus groups, it quickly became apparent that to ask this level of detail in questions for all general education subject areas was excessive for the one hour time limit. The majority of students did state that the general education courses in English promoted their writing ability. However, when asked for more detail students generally were unable to explain how it helped. The best responses were those that indicated that writing skills were improved. Similarly, some students reported that communication classes helped improve speaking skills. Nearly half the students reported that they gained critical thinking abilities in the English areas; however, those skills only became apparent to the student later in their academic career, not while taking English 102 and 104. Overall, students indicated that they were pleased with the learning in the English and Communication classes, but there were some exceptions. A sampling of their comments follows:

BEST COPY AVAILABLE

- English courses in the general education curriculum helped me become a better writer.
- All English skills came from here. None were carried over or simply forgotten since high school.
- Sharpened writing skills.
- Writing skills—more emphasis was placed on writing in the major than in general education.
- Started out with the basics and worked our way up. Instructor did a real fair job. Not much time was wasted on sentence structure. Was taught how to write papers and letters—things that were useful.
- Enjoyed the classes in public speaking, and because the instructor corrected our mistakes, learning was enhanced.
- Was not taught how to present an argument. Any learning was attributed to my initiative—did more on my own.
- About 2-3 semesters down the road, can actually see the difference in applying critical discernment and thinking skills. Early on, not realized.

These same students were asked to complete a short survey. When asked to respond to the question "I write and speak English effectively, including the ability to read and listen with understanding and critical discernment," 8 of the students strongly agreed, 1 agreed, and 1 disagreed. When asked the question, "The general education program at ENMU improved my English skills," 2 students strongly agreed, 6 students agreed, 1 student disagreed, and 1 student strongly disagreed.

In conducting the focus group with these students, it became clear that they were generally pleased with the learning that occurred, were supportive of the English and Communication departments, and felt prepared for employment or graduate school upon graduation from Eastern.

BEST COPY AVAILABLE

CAAP Reading Scale Results

The CAAP Reading Test measures students' comprehension as a product of referring, reasoning, and generalizing. The test items require the student to derive meaning from several texts by 1. referring to what is explicitly stated; 2. reasoning to determine implicit meaning; and 3. drawing conclusions, comparisons, and generalizations beyond the text. The test consists of four prose passages of about 900 words each that are representative of the level and kinds of writing encountered in college curriculum.

CAAP reading scale results have been reported in previous editions of the DATAWave. As reading is not a specific goal of Eastern New Mexico University's general education curriculum, it is not possible to link reading test results to specific coursework. However, students' reading abilities can be compared to incoming scores on the ACT. Also, score results can be examined for transfers versus natives, by motivation, by gender, and by ethnicity.

The national average for 4-year public college sophomores, the norm group most similar to Eastern's rising juniors, on the reading scale is 62.7 (standard deviation 5.3). Of the 890 students who have taken the CAAP, from the fall of 1983 through the spring of 1995, the average is 62.2. However, more than 50% of the students (51.2%) did score above the national average. Eastern students compare favorably to the national norm.

Table 1 reports the ACT score of 321 Eastern students by decile in comparison to their CAAP reading scale results. When scores are compared by decile ranges, it can be observed that 141 (44%) of the students in the cohort improved their reading ability over their incoming ACT score, 63 students (20%) showed no change, and 117 (36%) showed a decline in scores. ACT encourages caution in generalizing results from the decile comparison to all stu-

Eastern New Mexico University ACT-CAAP Scores
Longitudinal Achievement Results

Student Group = **All Students** — **Reading Test** — Reference Group = **4-Year Colleges**

ACT Deciles	CAAP Deciles 1	2	3	4	5	6	7	8	9	10	Total	
1	18*	8	6	5	0	0	0	1	0	0	35	
2	6	9	9	5	0	4	0	0	0	0	33	2nd Quadrant
3	8	6	8	12	0	9	3	2	1	0	47	
4	2	2	0	6	2	8	0	1	2	0	22	
5	2	2	7	7	1	10	2	7	3	0	41	
6	0	1	2	1	1	6	3	0	1	1	16	
7	0	2	4	4	2	9	2	7	6	5	41	
8	0	1	2	2	0	5	5	3	2	5	25	
9	0	0	0	1	2	5	2	11	2	11	34	4th Quadrant
10	0	0	0	0	0	1	2	2	8	14	27	
Total	33	31	36	42	8	57	19	34	25	36	321	
1st Quadrant Totals	33	27	28	34	3	31	5	11	6	0	2nd Quadrant Totals	
3rd Quadrant Totals	0	4	8	8	5	26	14	23	19	36	4th Quadrant Totals	

1st Quadrant

3rd Quadrant

Total Students = 321

Students On Diagonal = 63 (20%)

Students Above Diagonal = 141 (44%)

Students Below Diagonal = 117 (36%)

* **Cell entries are actual n-counts for Eastern New Mexico University.**

Table 1

dents. However, for the students whose incoming ACT scores and CAAP scores are available, there is clear evidence that a sizable number of students demonstrate overall improvement in reading abilities.

Approximately half (50.7%) of students tried their best on the self-report of motivation on the CAAP reading scale. For this group, the average score was 63.2, clearly above the national norm. The remaining half, who did not try as hard, all scored below (61.17) the national mean. Student motivation is considered to be a concern in the administration of the CAAP and analysis of the results. Scores differed significantly when classified by motivation ($F(4,885)=12.50$, $p=.0000$).

Of the 890 students who completed the CAAP, 523 indicated that they were first-time freshmen here at Eastern. These students scored slightly higher than the transfer students (62.37 versus 61.94), though these results were not statistically significant (1.24). Also, as it was evidenced in the writing scale scores, women scored statistically significantly higher than men ($F(2,887)=9.24$, $p=.0001$).

When CAAP scale scores are compared by ethnicity, students who preferred not to respond and students who responded as 'other' scored the highest, followed by those responding as white. The difference in comparing CAAP reading scale results by ethnicity was significant ($F(8,865)=10.15$, $p=.00$).

In conclusion, the CAAP reading test indicates that Eastern students perform well in comparison to national norms in their reading abilities. When students' CAAP results are compared to incoming ACT scores, when highly motivated students are compared to the national norms, and when native students are compared to transfer students, Eastern students compared favorably.

DATAWave
published biweekly by the Assessment Resource Office
Eastern New Mexico University
Editor: Alec M. Testa, Ed.D.
Production: Irene Nolen
De Guinn
Please send comments to: Assessment Resource Office
Station 9
Eastern New Mexico University
Portales, NM 88130
Office: (505)-562-4313
EMail: testaa@ziavms.enmu.edu

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130

Volume 3, No. 5 Published by Assessment Resource Office, Eastern New Mexico University Date: 3-27-96

CAAP Math Results

In this edition of the DATAWave, CAAP math results will be analyzed by student performance in general education mathematics classes. According to the philosophy of general education (ENMU 1995-97 Undergraduate Catalog), students should "understand and apply basic mathematical principles." The CAAP mathematics test is designed to measure student's proficiency and mathematical reason. The test assesses student's proficiency in solving mathematical problems encountered in most post-secondary curricula, emphasizing quantitative reasoning rather than the memorization of formulas. The content areas include pre-, elementary, intermediate, and advanced algebra, coordinate geometry, trigonometry, and introductory calculus. Complete descriptions of the scale scores are available in the Assessment Resource Office.

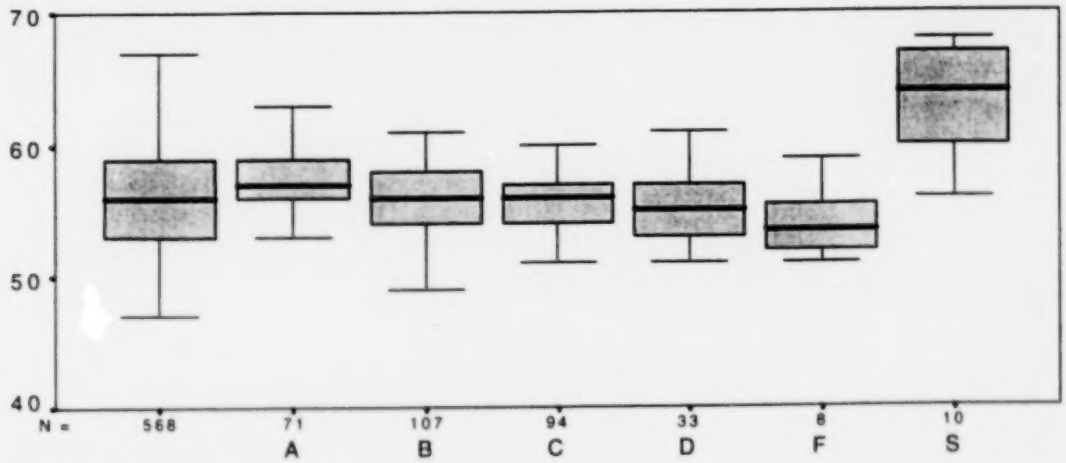
There are eleven courses listed in the general education distribution for understanding and applying mathematical principles. The students' CAAP results (n=891) were matched with grades earned in those classes. An appropriate number of matches were found for five classes. Care was taken to ensure that students had completed the math course prior to being assessed by the CAAP. In this edition of the DATAWave, the CAAP results, by courses completed by students, will be examined. In a future edition of the DATAWave, a number of other variables, such as student gender, ethnicity, and preparedness, will be explored.

The national average, according to the fall of 1995 CAAP user norms, was 58.0 (standard deviation = 3.8). The average score for Eastern New Mexico University, since 1993, is a 56.18 (s.d.=3.47). For students who passed Math 107, that is earned a letter grade of "C" or better, the average score was a 56.12 compared to a 56.20 for students who did not take or pass Math 107. Students who passed Math 110 scored 57.86 on average compared to a 55.66. Students who passed Math 113 scored on average a 55.76, which was lower than a 56.21 scored by students who did not attempt Math 113. Students who passed Math 123 scored a 60.88, compared to a 55.77. Students who took Stat 213 scored a 57.53, compared to a 55.92. Of the 272 students who completed Math 107, 71 earned A's, 107 earned B's, and 94 earned C's. Respectively, the mean CAAP math scores for these groups were 57.39, 56.01, and 55.29. Two hundred and six students earned a C or better in Math 110 (58 A's, 74 B's, and 74 C's). The mean CAAP math scores were: A=58.97, B=57.99, and C=56.88. In Math 113, 58 students earned a C or better. Students who earned A's (n=16) averaged 56.31 on the CAAP math test, B's (n=16) averaged 56.81, and students with C's (n=26) averaged 54.77. Seventy students earned a C or better in Math 123. "A" students (n=14) averaged 61.58, "B" students (n=28) averaged 61.29, and "C" students (n=28) averaged 59.75. Of the 138 students in the cohort who passed Stat 213, 52 earned A's (CAAP math score=58.85), 54 earned B's (56.76), and 32 earned C's (56.72).

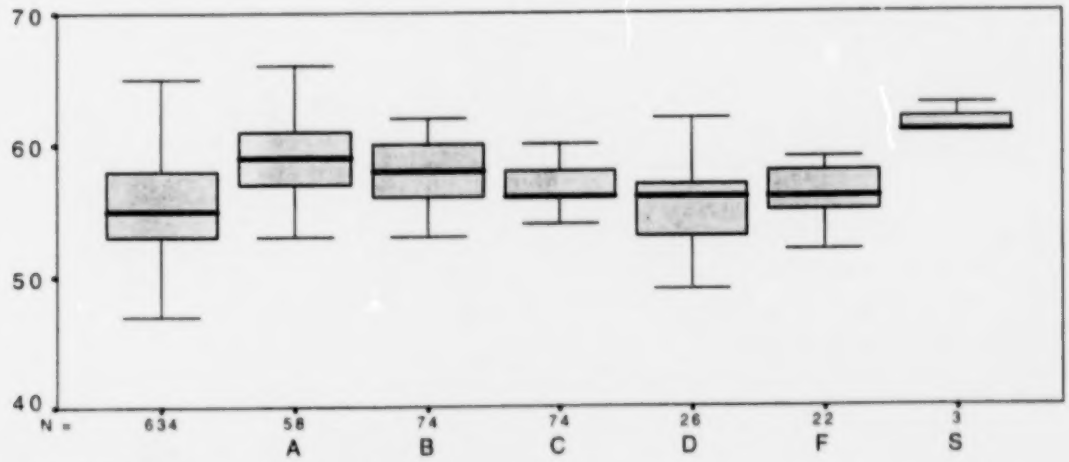
These distributions of scores were not significant for Math 107 and Math 113; however, they were significant for the other three courses—Math 110, Math 123, and Math 213. It is most interesting to note that students who passed Math 123 scored well above the national mean and students who passed Stat 213 scored very near the national mean. For the purposes of this article it is assumed that these courses are more rigorous, and that students who select these courses perhaps have better beginning skills. However, with regards to outcomes assessment, the institution can only be responsible for learning that occurs in the classes which stu-

BEST COPY AVAILABLE

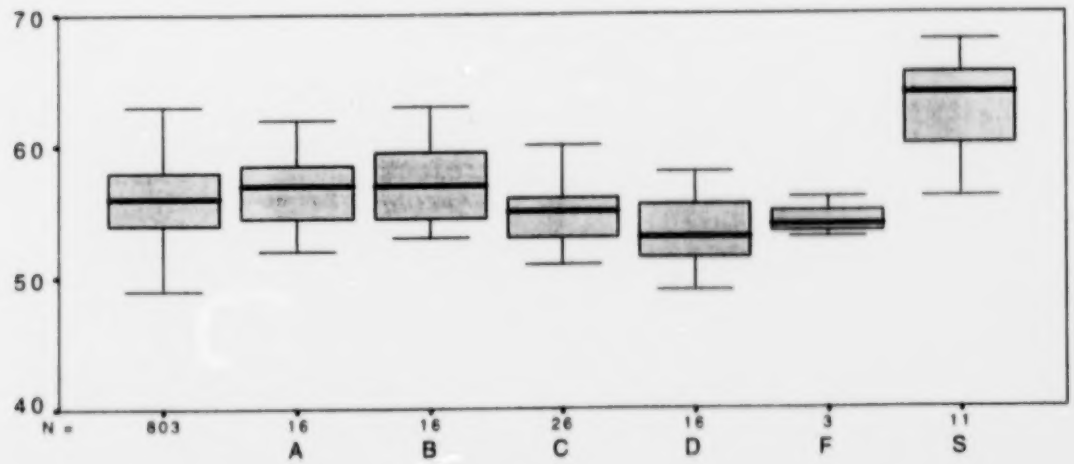
MATH 107 Intermediate Algebra



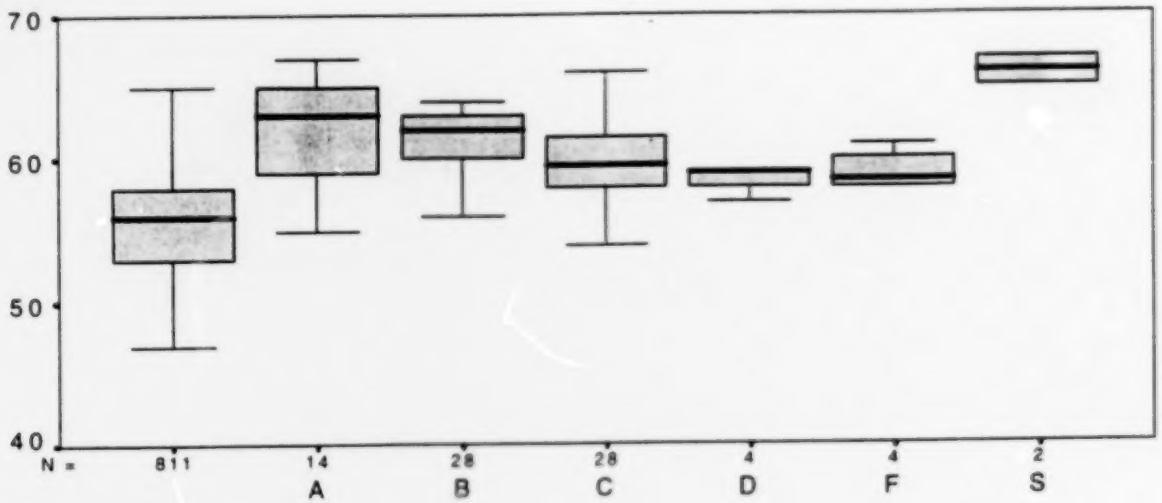
MATH 110 College Algebra



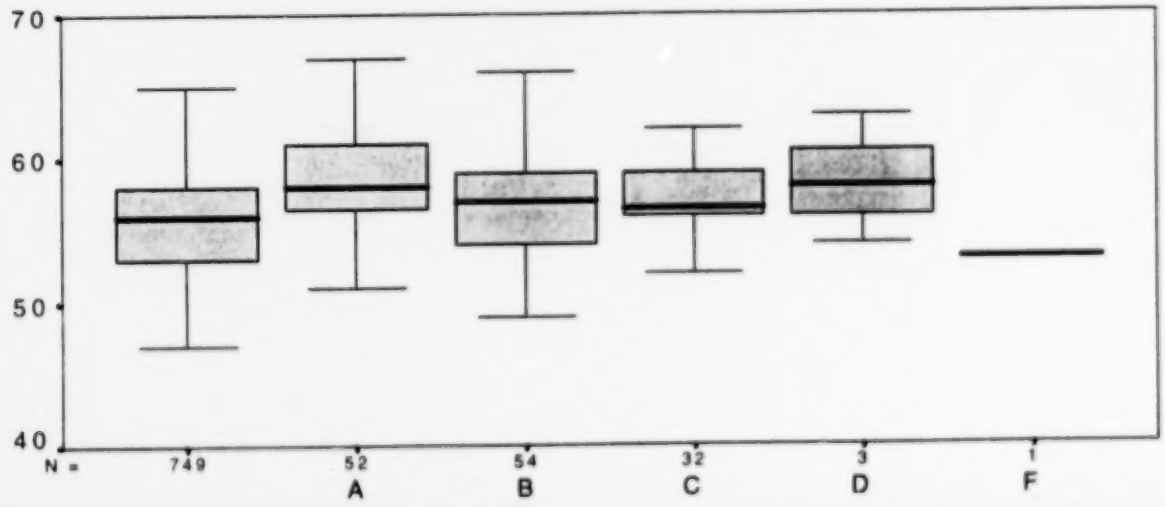
MATH 113 Mathematics for General Education



MATH 123 Calculus



STAT 213 Statistical Methods



	n	$\bar{X}$	S.D.	$\bar{X}$ Passed	$\bar{X}$ Did not take/pass
National	---	58	3.8		
ENMU	891	56.18	3.47		
Math 107	272			56.12	56.20
Math 110	206			57.86	55.66
Math 113	58			55.76	56.21
Math 123	70			60.88	55.77
Stat 213	138			57.53	55.92
0 Math Classes	406	55.14	3.41		
1 Math Class	264	56.50	3.41		
2 Math Classes	179	57.67	2.92		
3 or more Math Classes	42	57.81	3.23		

dents take. In the three examples, the Math Department performed quite well. However, in two examples, Math 107 and Math 113, students don't do quite as well. In particular, students who have taken Math 113 scored worse than students who had not. This certainly does not mean that Math 113 had a negative effect on mathematical abilities, but rather, the people who selected to take that class perhaps were not as confident in mathematical abilities.

Pages 2 and 3 contain a number of box whisker charts which show the distribution of mean scores for the courses. In these charts, the boxes represent the middle 50% of all scores while the lines that extend from the boxes (the "whiskers") show the full distribution of the scores. (For the purposes of this article, outliers have been eliminated from the charts.) The heavy line represents the median for the distribution.

For the majority of students who have taken math classes at Eastern, ACT scores were not available. However, were they available, the mean scores of students who passed Math 107 were lower than those who did not attempt Math 107 (17.98 versus 20.83). Similarly for Math 113, ACT scores of students who passed were lower than those who did pass (19.21 versus 19.68). In all other cases, the math scores of students who successfully attempted and completed the courses were higher than those who did not.

Of the 891 students who have participated in the CAAP at Eastern, 406 have not taken any math classes. Two hundred sixty-four have taken one, 179 have taken 2, and 42 have taken 3 or more. For those who have not taken any math classes their mean CAAP math score was a 55.14, those who have taken one class or more with a "C" or better earned a 56.50, two or more a 57.67, and three or more a 57.81.

In conclusion, students who have successfully passed (a "C" or better) math courses at Eastern scored slightly below the national average. These students do, however, score higher than students who have not completed courses in mathematics at Eastern. Because of the low number of students who have completed the ACT, it is not possible to conduct a regression analysis. However, if asked whether Eastern's math classes contribute to overall performance on the CAAP math scale, it seems that the evidence is yes. Members of the campus community are invited to forward their own conclusions and observations to the Assessment Resource Office, ext. 4313 or email at testaa@ziavms.enmu.edu.

DATAWave
published biweekly by the Assessment Resource Office
Eastern New Mexico University
Editor: Alec M. Testa, Ed.D.
Production: Irene Nolen
De Guinn
Please send comments to: Assessment Resource Office
Station 9
Eastern New Mexico University
Portales, NM 88130
Office: (505)-562-4313
EMail: testaa@ziavms.enmu.edu

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130

Volume 3, No.6 ~~~~ Published by Assessment Resource Office, Eastern New Mexico University ~~~~ Date: 4-10-96

More On Math

In last week's DATAWave, students' performance on the CAAP math score was reported. Special attention was paid to how students performed when classified by courses completed. In this edition of the DATAWave, students' performance by incoming ACT score, gender, and ethnicity will be reported. Also, students' remarks regarding the general education courses in mathematics (that were collected during the fall 1995 focus groups) and survey data will be reported.

Three hundred twenty-two students had both CAAP math scores and ACT scores available. Of those students, 119 (37%) scored below the diagonal. That is, when their scores were converted to deciles, students scored lower on the CAAP math scale than they did on the comparable ACT scale. One hundred twenty-three (38%) scored above the diagonal. That is, 38% of students improved their math abilities as measured by the CAAP math scores in comparison to their ACT math score. Eighty students (25%) remained about the same. (Please see Figure 1 on page 3 for the decile distributions for these scores).

When CAAP math scale scores are compared by gender, men scored higher than women (56.48 vs. 55.96). Reasons why this might be were discussed in the DATAWave during the spring of 1995, and this author continues to believe that the most likely explanation is socialization. That is, men are encouraged to do well in courses involving mathematics, whereas women often are not.

On the CAAP math scale at Eastern New Mexico University, students whose self-reported ethnicity was White or Caucasian (n=539) scored highest (mean = 56.66, standard deviation = 3.61), and African-Americans (n=48) scored lowest (mean = 54.63, standard deviation = 3.08). The average scores for other ethnic groups (and these are categories provided by ACT) were: American-Indian/Alaskan (n=24) 55.25, Mexican-American or Chicano (n=98) 55.18, Asian or Pacific Islander (n=10) 55.4, Puerto Rican, Cuban, or Hispanic (n=68) 55.26, Filipino (n=2) 56, other (n=13) 56.07, and those who preferred not to respond (n=73) 55.95. ACT does not provide norms for various ethnic groups; therefore, comparisons of ethnic minorities at Eastern to a national cohort cannot be made.

Commencing in the fall of 1995, graduating students were randomly selected to participate in focus groups and to complete a short survey on their general education experiences here at Eastern New Mexico University. In the fall of 1995, ten such students participated. When asked to respond to the statement, "I understand and can apply basic math principles," 4 strongly agreed, 4 agreed, 1 disagreed, and 1 strongly disagreed. That is, 80% of students agreed or strongly agreed that they understood and could apply basic math principles. Students were also asked to respond to the statement, "The general education program at ENMU improved my basic mathematical abilities." Their responses were 3 strongly agreed, 3 agreed, 1 disagreed, 2 strongly disagreed, and 1 student did not respond. Of this small sample, 66.67% of students either agreed or strongly agreed that the general education program at ENMU improved their mathematical abilities.

Students were also asked a series of questions to probe their opinions of the general education courses in mathematics prior to completing the survey. Some of their responses are as follows:

- In high school, I could take a lot of what I wanted. Therefore, I finished math requirements early and focused more on other areas. I took Math 101 in college and was blown away! Homework assignments were given more frequently, thereby increasing learning. I didn't just write some numbers and turn in an assignment—I had homework and I had to work.
- I have a terrible time with math, and I wasn't prepared from high school. In college, my math instructor was not English speaking; this made learning even more difficult. I did take an active role in my education; however, I don't feel that learning occurred in college level math classes.
- In high school, I took basic math courses where I made A's. In college, I took Math 100 and 101 and also made A's, but when I took Math 107, the teacher (teaching assistant) did not speak English very well which made learning very difficult. Stat 213 was difficult, but I got through it. You were made to learn by doing homework.
- Math 100 should be a mandatory class. Would make it a little easier for 107 and 213.
- Only math taken was statistics. Big help. Has used it in other classes: production management, regressions.

BEST COPY AVAILABLE

- Had heard not to take courses from TA's (teaching assistants). Took math from the professors. Statistics should be a required class. You use it for everything—in psychology, in everything; it really ought to be a requirement.
- Business calculus should be a requirement for business majors (Eastern is the only graduate school in the country that does not require business calculus).

Two weeks ago I attempted to draw conclusions from the data, observing that the results indicated overall enhancements in student learning. This may be almost as intuitive as scientific, and comments from the campus are welcomed.

Update on Assessment from the North Central Association

Recently I attended the annual meeting of the North Central Association Commission on Institutions of Higher Education. I am pleased to report that at this meeting the assessment plan for Eastern New Mexico University was one of 33 plans included in a special resource area on outcomes assessment (ENMU-Roswell was also included). The impressions that I took from the annual meeting are that outcomes assessment continues to be an important endeavor for the Commission; that clear and concise instructions are still limited, yet increasing; and that the Commission is more explicit than ever before on the need to implement outcomes assessment plans. This increased emphasis in outcomes assessment is evidenced by the distribution of a working draft wherein the Commission proposes changes for two of the criteria for assessment (the institution is accomplishing its educational other purposes; and, the institution can continue to accomplish its purposes to strengthen its educational effectiveness). In this document, eight items of an effective assessment program are offered. In this article, I would like to report these items to you with comments on my perspective of Eastern's compliance (in italics).

1. A strong, readily-identifiable relationship exists between overall institutional mission and objectives and the specific educational objectives of individual departments or programs.

At Eastern all departmental Academic Outcomes Assessment Plans (AOAP's) include an Expanded Statement of Institutional Purpose. Essentially, departments prepare a goal statement which flows from the University's Mission Statement. Though the institution has recently adopted (fall 1996) a new Mission Statement, units will have the opportunity to incorporate it when they review their plans next fall.

2. Faculty, including on-campus and off-campus faculty, own and drive the program and use it to find ways to improve the education they provide. The institution motivates, recognizes, and rewards faculty efforts in assessment.

Faculty are responsible for the development of the plans in their departments. They are also an important part of the assessment committee which set up the protocol for the plans and are responsible for the review of these plans. ENMU-Roswell, with a separate accreditation, is not part of the assessment effort here at the Portales campus. There is a need to determine how faculty at the Ruidoso Instructional Center should be included in our assessment efforts. Currently, through a coordinated effort of the College of Liberal Arts and Sciences, the Vice President for Academic Affairs, the Ruidoso Instructional Center, and the Assessment Resource Office, students that are graduating in the spring of 1996 will be assessed. An individual will be identified as the assessment coordinator for the Ruidoso campus for AY 96-97.

More needs to be done to motivate, recognize, and reward faculty efforts in assessment. The Assessment Resource Office would welcome suggestions. The Research and Public Service Award from the Research and Public Service Funds from the state legislature may be an appropriate source for such recognition and rewards. Increased motivation, recognition, and rewards should be a goal for assessment efforts for AY 96-97.

3. Authority for the design and operation of assessment is shared throughout the faculty and administration.

The design and operation of outcomes assessment for academic programs at Eastern is in compliance with University governance and academic administration. The chief academic officer, Dr. George Mehaffy, is ultimately responsible for the outcomes assessment plan.

4. Typically, an individual, not a group, is responsible for overseeing the assessment efforts of the institution.

As mentioned in the previous statement, Dr. Mehaffy is responsible for the oversight of assessment efforts at the institution. The Assessment Resource Office is responsible for monitoring and reporting to him each unit's compliance with their assessment plan.

5. Assessment might be included within a broader structure of regular program review, but the evaluation of instruction and faculty performance common to such programs does not constitute assessment of student learning.

This statement is specific to those institutions which do not have specific plans for the measurement of student learning, but use existing measures. Here at Eastern, we have a separate process for the assessment of student learning; however, the plan does suggest that all curricular changes brought to general education curriculum program review and graduate committees ought to be accompanied by assessment results. Assessment results are not part of the faculty evaluation process.

Eastern New Mexico University ACT-CAAP Scores
Longitudinal Achievement Results

Student Group = **All Students** — **Mathematics Test** — Reference Group = **4-Year Colleges**

ACT Deciles	CAAP Deciles 1	2	3	4	5	6	7	8	9	10	Total	
1	17*	21	7	8	4	1	3	1	1	0	63	
2	1	6	4	2	2	1	0	0	0	0	16	2nd Quadrant
3	4	12	5	16	4	4	1	0	0	0	46	
4	0	8	5	7	3	3	2	2	0	0	30	
5	0	7	2	12	8	4	6	2	1	0	42	
6	0	2	0	8	5	4	6	3	0	0	25	
7	0	0	0	1	2	4	4	2	0	0	13	
8	0	2	1	2	1	4	10	12	3	1	36	
9	1	0	0	0	0	4	4	14	4	8	35	4th Quadrant
10	0	0	0	0	1	0	0	1	1	13	16	
Total	23	58	24	56	30	29	36	34	10	22	322	
1st Quadrant Totals	22	54	23	45	21	13	12	5	2	0	2nd Quadrant Totals	
3rd Quadrant Totals	1	4	1	11	9	16	24	29	8	22	4th Quadrant Totals	

1st Quadrant

3rd Quadrant

Total Students = 322 — Students Above Diagonal = 123 (38%)

Students On Diagonal = 80 (25%) — Students Below Diagonal = 119 (37%)

* Cell entries are actual n-counts for Eastern New Mexico University.

Figure 1

6. Feedback loops are essential.

Assessment results are to be used in support of changes in curriculum brought to the general education curriculum program review and graduate committees. All academic units, on an annual basis, beginning next fall are to report on the results of their outcomes assessment endeavors, including how the results will be used. These reports are sent from the department chairs to the college deans to the Vice President for Academic Affairs.

7. Students should understand the purposes of assessment. Some institutions provide information about assessment in a variety of student-oriented publications. Some include students on assessment committees.

It is perhaps in this area that Eastern should pay the most attention. It is unclear to this writer if students have a clear understanding of outcomes assessment and the role it plays in their instruction. Over the summer, this office will be considering a number of ways to increase students' understanding, awareness, and appreciation of outcomes assessment with the hopes of piloting some new efforts in the fall.

8. Institutions should measure student learning using a variety of direct and indirect measures and methods. Institutions should also consider incorporating into their programs measures of cognitive learning (knowledge acquisition), behavioral learning (skill acquisition), and affective learning (attitudinal development).

Currently, a number of direct and indirect measures are used here at Eastern. For example, students performance are direct measures, and alumni surveys and employer surveys are indirect measures. In the working draft previously mentioned and in other materials circulated by Commission staff, it is becoming apparently clear that organizing assessment through measures of cognitive learning, behavioral learning, and affective learning is attractive. This office will endeavor to make available to the administration, the University's self-study committee, and the accreditation team (scheduled for visitation in March of 1997) how our assessment efforts do or do not comply with this stratification.

In conclusion, the faculty, staff, and administration of Eastern can be assured of their compliance with the Commission's intentions for outcomes assessment. In the past, other institutions in the state have been able to say that, but now find themselves out of compliance. The expectations for outcomes assessment are constantly increasing. The institution will be well served by paying attention to how faculty are motivated and recognized for their contributions to outcomes assessment, and how students are informed of the importance of outcomes assessment. Not to suggest that these do not occur, but rather that this could increase with the overall result being an improved outcomes assessment program.

DATAWave
published biweekly by the Assessment Resource Office
Eastern New Mexico University
Editor: Alec M. Testa, Ed.D.
Production: Irene Nolen
De Guinn
Please send comments to: Assessment Resource Office
Station 9
Eastern New Mexico University
Portales, NM 88130
Office: (505)-562-4313
EMail: testaa@ziavms.enmu.edu

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130

Volume 3 No 2 Published by Assessment Resource Office

CAAP Science Reasoning Results

Eastern New Mexico University's philosophy of general education (Undergraduate Catalog 1995-1997) states that "traditionally, one purpose of the bachelor's degree at a state university has been to prepare graduates for a lifetime of learning and responsible citizenship." Specifically in the areas of the sciences, graduates of Eastern should be able to "understand and apply scientific principles and develop an awareness of the role of science and technology in the contemporary world." To assist the University, faculty, and the general education committee in assessing the success of the general education curriculum, the CAAP Science Reasoning scale is administered. Students also participate in focus groups and complete a locally developed survey.

The CAAP Science Reasoning scale is designed to measure students' skills in scientific reasoning. The contents of the science reasoning test are drawn from biology, chemistry, physics, and the physical sciences (e.g., geology, astronomy, meteorology). The test emphasizes scientific reasoning skills rather than recalling scientific content or being highly skilled in mathematics or reading. A stimulus on the test may conform to one of three different formats: data representation, research summaries, and conflicting viewpoints.

The national norm, reported for fall of 1995 for public four-year college sophomores, is a 60.6 with a standard deviation of 4.7. Eastern students from the fall of 1993 through the spring of 1995 have averaged 59.51 with a standard deviation of 4.41. There is a steady decline in these scores, which is statistically significant. Students in the fall of 1993 scored a 60 (s.d.=4.36, n=5.55), in the spring of 1994 a 59.44 (s.d.=4.21, n=94), in the summer of 1994 a 59.41 (s.d.=5.05, n=17), in the fall of 1994 a 58.83 (s.d.=4.57, n=148), and in the spring of 1995 a 57.4 (s.d.=4.57, n=76).

When students who self-reported that they began at Eastern as first-time freshmen are compared to students who self-reported that they transferred to Eastern, native freshmen scored slightly higher (59.53 vs. 59.49), and this is not a statistically significant result. Also, men scored higher than women on the CAAP Science Reasoning scale (59.86 vs. 59.28), and this, likewise, is not a statistically significant result. When scores are compared by students' self-reported ethnicity, white students, those who self-reported "other", and those who "preferred not to respond" scored highest [means are 60.4 (s.d.=4.46, n=538), 60.15 (s.d.=3.34, n=13), and 60.07 (s.d.=4.76, n=73), respectively]. Mean scores for other ethnic groups are: African-Americans=55.38 (s.d.=3.37, n=48), American Indians/Native Americans=59.46 (s.d.=3.73, n=24), Mexican Americans/Chicanos=57.8 (s.d.=3.67, n=98), Asians=57.6 (s.d.=3.27, n=10), other Hispanics=57.57 (s.d.=3.41, n=68), and Filipinos=62 (s.d.=7.08, n=2). These results are statistically significant and are consistent with CAAP results in all scales, whereas ethnic minority students are consistently scoring lower than white students.

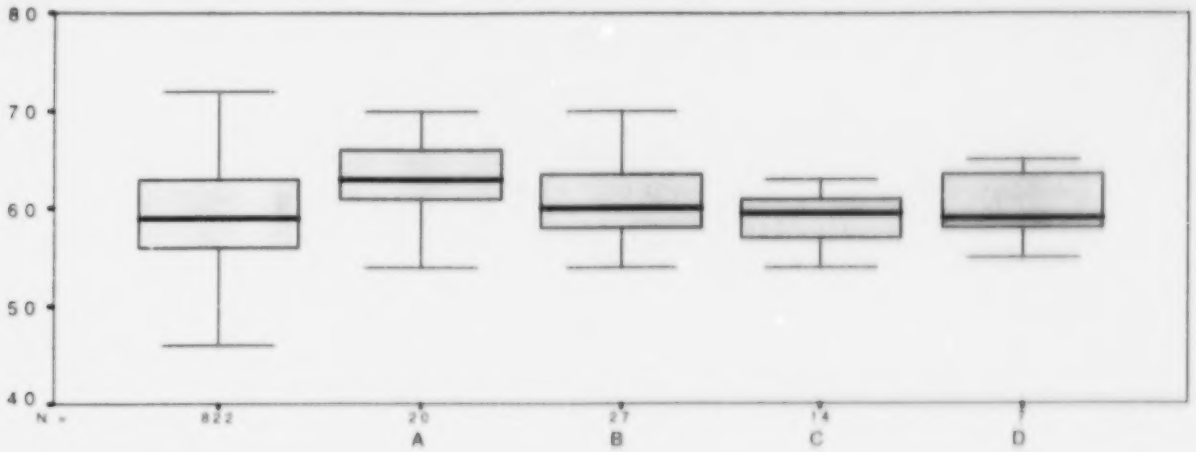
Students' mean scores in biology, chemistry, geology, and physics on the CAAP Science Reasoning test may be found on pages 2 and 3 in box plot diagrams. A breakdown of these results follows.

Of the students in the cohort who took Biology 113, 92 received a letter grade of "A" and achieved a mean CAAP Science Reasoning score of 61.08. One hundred twenty-three students earned a letter grade of "B" and achieved a mean score of 60.02, 130 students earned a letter grade of "C" and achieved a 58.25, 45 students earned a "D" and scored a 56.73, and 16 students earned an "F" and scored a 57.5.

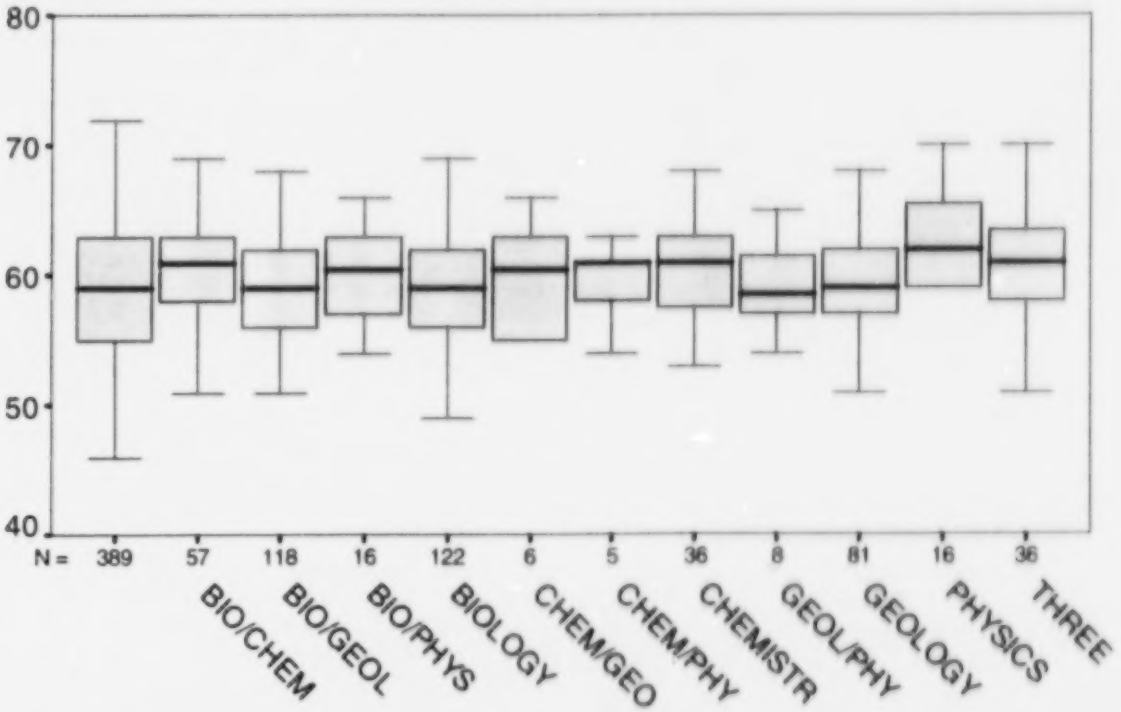
Of the students in the cohort who took chemistry, 32 students earned the letter grade of "A" and achieved a mean score of 62.12, 39 students earned a "B" and scored a 60.49, 60 students earned a "C" and scored a 59.62, 18 students earned a "D" and scored a 56.94, and 4 students earned an "F" and scored a 55.0.

Of the students in the cohort who took geology, 86 earned a letter grade of "A" and achieved a mean score of 61.26, 103 earned a "B" and scored a 58.63, 56 earned a "C" and scored a 57.82, 25 earned a "D" and scored a 55.76, and 7 earned an "F" and scored a 57.86 on average.

PHYSICS 113



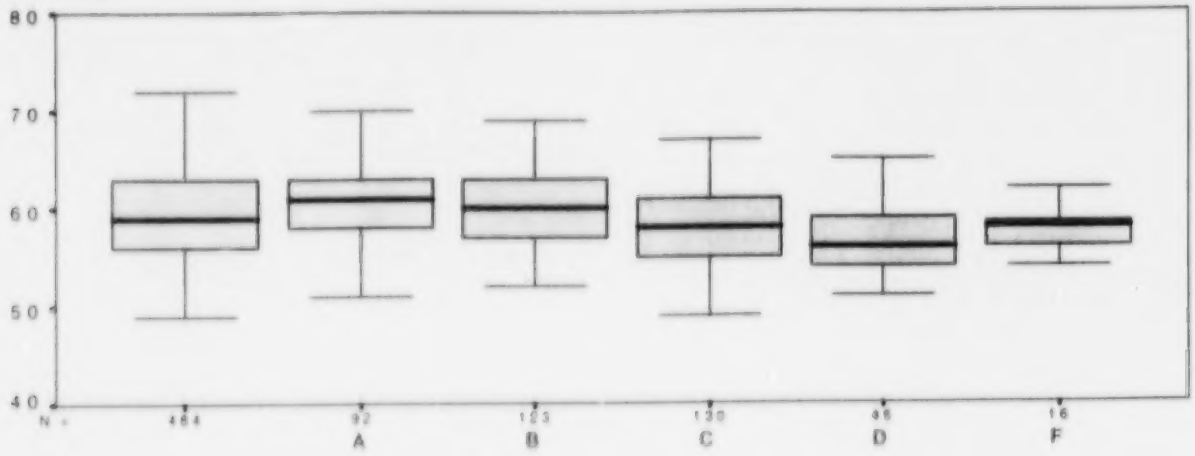
CAAP PERFORMANCE BY COMBINATION OF COURSES



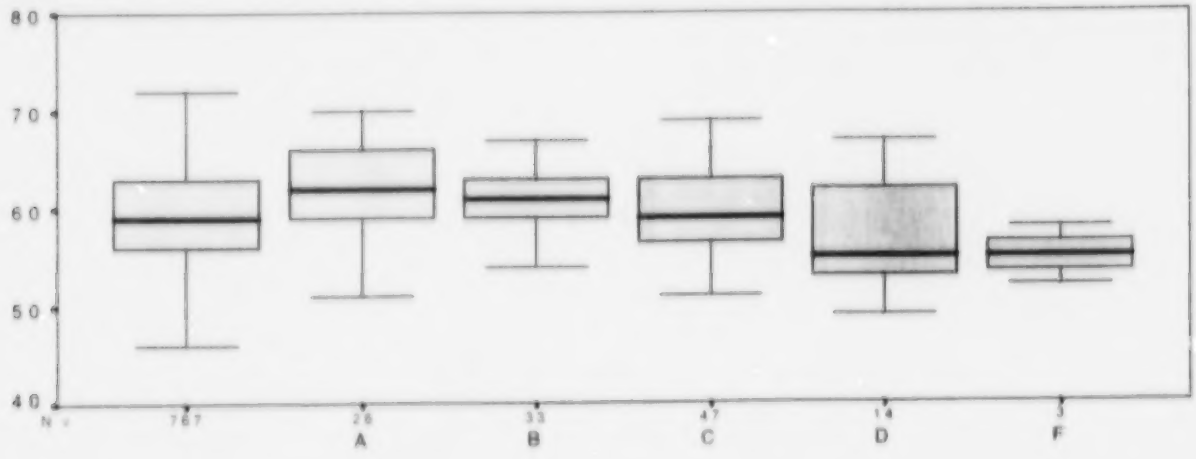
In the cohort for students who took physics, 20 earned an "A" and achieved a mean CAAP Science Reasoning score of 63.15, 27 earned a "B" and scored a 60.81, 14 earned a "C" and scored a 59.29, and 7 earned a "D" and achieved a mean score of 60.29

Of the students who have completed the CAAP, an analysis was also conducted of the courses taken to meet the science requirement. Students who completed physics with a passing grade (that is a letter grade of C or better) achieved a mean score of 62.69 (n=16). Scores for course distributions, in descending order, for the remaining members of the cohort are: students who took 3 or more classes scored a mean of 60.87 (s.d.=4.54, n=36), students who passed both biology and chemistry scored a mean of 60.68 (s.d.=4.29, n=57), students who just took chemistry scored a mean of 60.33 (s.d.=3.81, n=36), students who took biology and physics scored a mean of 60.26 (s.d.=3.99, n=16), students who took chemistry and geology scored a mean of 60 (s.d.=4.47, n=6), students who took chemistry and physics scored a mean of 59.41 (s.d.=3.51, n=5), students who just took geology scored a mean of

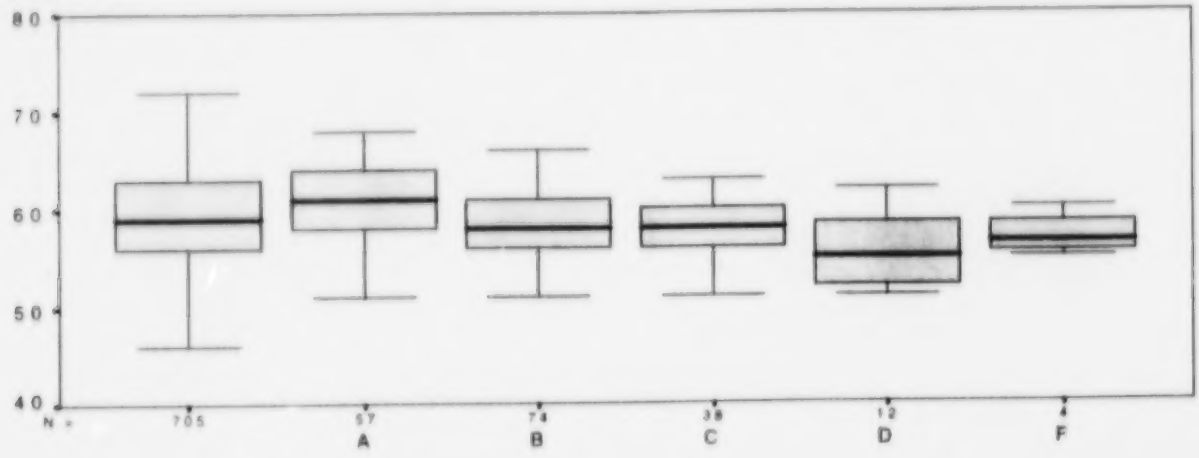
BIOLOGY 113



CHEMISTRY 113



GEOLOGY 113



59.32 (s.d.=4.25, n=81), students who just took biology scored a mean of 59.15 (s.d.=4.09, n=122), students who took biology and geology scored a mean of 59.13 (s.d.=3.95, n=118), and students who took geology and physics scored a mean of 59.13 (s.d.=3.52, n=8). Students who passed no classes at Eastern with a "C" or better scored on average a 59.26 (s.d.=4.85, n=389); however, it is unclear if these students took math courses at other institutions. (The last chart on page 3 graphs these mean CAAP scores).

Randomly selected graduating seniors were invited to participate in focus groups commencing in the fall of 1995. Though 100 students were invited, 10 such students participated. For a summary of these comments, please see the box entitled "Focus Group Responses" to the right. These same students were also asked to complete a short questionnaire on their learning in general education here at Eastern. When asked to respond to the statement, "I understand and can apply scientific principles and have an awareness of the role of science and technology in the contemporary world," all students either agreed or strongly agreed. When asked to respond to the statement, "The general education program at ENMU improved my scientific understanding and applications," again, all students either agreed or strongly agreed with this statement.

As in past issues, it seems the qualitative information collected in focus groups and surveys clearly indicate that students do achieve general education goals here at Eastern. The qualitative data collected through the CAAP is less conclusive, primarily because it is difficult to know what type of coursework transfer students have taken, as well as their ability in the sciences when they begin here at Eastern. As usual, these results are offered to the campus community to encourage their consumption.

Just a quick note. This is the final DATAWave of the 1995-1996 academic year. Shortly, a survey for the DATAWave and the Assessment Resource Office will be mailed to you. As always, we welcome your suggestions for improvement of the services offered to the University community.

Focus Group Responses

- Enjoyed all science classes.
- Class size was just too big.
- More beneficial if the lab was required. Enjoyed the classes, but with the lab would have gotten more out of it.
- Geology was good. Enjoyed it. Saw things for years and did not know name of site until the course was taken.
- When a freshman, did not have the same mentality. Matured. Only took classes to get them over with. A lot was covered in the instruction (science courses). This general education program is good.
- Class is somewhat overwhelming because of the way information is presented. You get the hard stuff then flow to the easy. Not like English where you learn sentence, paragraph, then grammar, and so on. You have to learn the "why's", then you go on to the "how's." So much information is presented in the sciences at one time, it is truly overwhelming to most. You might start off with the animals, crustaceans, then on to humans. Can be a bit much.
- More learning occurred with the lab than without. It would be better (more learning would occur) if the lab were required.
- Learned a lot in biology.
- Views have changed since being introduced to the sciences. Now there is more understanding.
- Geology. If younger, would have hated the class, but as a returning student, made more aware of the various roles science plays in society.

Eastern New Mexico University is an affirmative action and equal opportunity employer. The University does not discriminate on the basis of race, color, national origin, sex, or handicap in its programs, activities, or employment. Persons seeking additional information about the University's nondiscrimination policy should contact the Executive Director for Planning & Analysis, ENMU Station #2, Portales, NM 88130.

Assessment Resource Office, Station 9
Eastern New Mexico University
Portales, NM 88130